The origin and affinities of Berthelot's Pipit *Anthus bertheloti*

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The warm temperate eastern North Atlantic or Macaronesian islands support a number of endemic birds whose distinctive features may presumably either be the result of adaptation to the insular environment, or preserve characteristics of earlier forms of mainland species. Extreme examples are provided by the laurel pigeons *Columba junoniae, C. bolli* and *C. trocaz* of the Canaries and Madeira, which might either be derived from one or more species that have been lost on the mainland, or a series of colonisations by the present Wood Pigeon *C. palumbus* (which once had a rather distinct race on Madeira) modified on the islands in different ways, or earlier forms of the Wood Pigeon which has undergone further development on the mainland.

Similarly, since another endemic species, Berthelot's Pipit *Anthus bertheloti*, has received little attention from zoogeographers such as Voous (1960) and Harrison (1982), I looked at them in search of evidence for their ancestry, concluding "while it usually appears to be assumed that they are descended from the Tawny Pipit *A. campestris*, presumably because of their pale colour and rather similar "chup" call note (I did not hear the song), they are actually closer in size to the Rock and Water Pipits *A. petrosus* and *A. spinoletta*, some of which also have a pale plumage, and moreover resemble Berthelot's Pipit in having the four longest primaries similar in length" (Bourne 1984). When I met the relevant editor of the *Birds of the Western Palearctic* I asked what he made of this, and he subsequently kindly shared the credit with me for a text that I never saw (Cramp 1988: 331).

This has now been challenged by Alström & Mild (1993), who repeat that Berthelot's Pipit appears to be an insular derivative of the Tawny Pipit. This does not really deal with the problem which concerned me, which was why it has evolved in the way that it has. Now that I have seen the song-flight of Berthelot's Pipit, while it seems indisputable that it must indeed be closely related to the Tawny Pipit, surely there is also at least one other species which appears allied to both, with an intermediate appearance, and similar tertials, behaviour (including the song) and habitat (arid rough ground from plains to mountain tops), so that surely it should also be included in the discussion? This is the Long-billed Pipit *A. similis*, with numerous races in the Middle East, Africa and India (details of all these birds will be found in Cramp 1988).

This transforms the situation, since it now not only becomes more debatable whether *A. bertheloti* is derived from *A. campestris*, but also whether one or both of these may be derived from *A. similis*, or vice

versa, or whether they all arose independently from some common ancestor?

There are a limited number of possibilities. According to Olson (1985) the Passeriformes did not become numerous until about 10–20 million years ago in the Miocene. Kurtén (1968) has deduced that European mammal species and Brodkorb (1971) that bird species subsequently persisted for about three million years under the stable climate of the Pliocene, but a much shorter time during the climatic fluctuations of the Pleistocene. It also appears from the present distribution and variation of Palearctic birds (Vaurie 1959, 1965) that while the 10,000–15,000 years since the last glaciation may have sufficed for the development of many often highly distinct races, it has not been long enough for the emergence of many new species. Therefore there should have been time for the development of more than one, but not many, successive species in each modern genus, most of which appear to have originated in the Pliocene, since when the well-studied genus *Homo*, for example, appears to have had time to pass through a sequence of three species and three races (Wood 1994).

In discussing the evolution of *A. bertheloti* it is desirable to start by considering the whole genus *Anthus*, and its relation to its nearest allies. It seems likely that the first streaky, squeaky proto-pipit with cryptic plumage and a ventriloquial call rather similar to those of a young wagtail *Motacilla* originated in the Pliocene in some area of open ground which has now become difficult to locate owing to the subsequent wide dispersal of its descendants. One population, which I shall refer to as the Tundra Pipit, may have settled on the open ground then widespread in high northern latitudes, and started to migrate into lower latitudes in the winter to avoid the short northern days. Here it may have come into contact with another, more sedentary, population, referred to as the Desert Pipit, which had settled on the other large area of open ground, the subtropical deserts, with the result that they diverged in their form, ecology and behaviour. The marked fluctuations in climate during the Pleistocene may then have led to the development of many specialised local representatives of each form.

If we now consider the Western Palearctic pipits which I know best in particular, and ignore the probability that others have been lost, there are now three species or groups with a distribution implying further evolution within the area (as opposed to some other more highly migratory derivatives of the Tundra Pipit such as the Tree and Red-throated Pipits *A. trivialis* and *A. cervinus*, which may have originated in the area with severer winters further east). They comprise the widespread small, partially migratory Meadow Pipit *A. pratensis* of northern grassland; the more local medium-sized *spinoletta/petrosus* group which has now broken up (or been forcibly split!) into the pale southern montane Water Pipit and dark northern coastal Rock Pipit, which disperse in the winter; and the large, pale *campestris/similis* group in the Mediterranean area, which move south to be replaced by the Meadow and Water Pipits in the winter.

The simplest explanation for their evolution is surely that the complex Water Pipit group, which have a circumpolar range and still

predominate on the periphery in North America, may be the most direct descendants of the hypothetical Tundra Pipit; the Meadow Pipit, with a very similar voice and display, may be an early derivative of this group which developed and came to replace it in the comparatively mild northwestern Palearctic grasslands during the Pleistocene; and the Rock Pipit is a later derivative which has occupied the rocky northern coasts left unoccupied by the Meadow Pipit during a late interglacial or even the postglacial period. Similarly, the Long-billed Pipit may be descended from the hypothetical Desert Pipit, while the Tawny Pipit may be an early derivative comparable to the Meadow Pipit in the Mediterranean area.

There are several possible explanations for the origin of Berthelot's Pipit. I originally wondered if it might be an ancient derivative of the widely-dispersed primeval Pliocene proto-pipit, but it hardly seemed distinct enough for such antiquity. Then I wondered if it might be a glacial relict derived from the Tundra Pipit. Now after seeing its song-flight I suggest that it is more likely to be an early derivative of the ancestral Desert Pipit, of roughly equal status to (and forming a superspecies with) the Tawny and Long-billed Pipits, which has diverged from the latter in the opposite direction to the Tawny Pipit, and converged with the pipits of similar habitats further north in its size, form and appearance. The fact that it still appears to be primarily a bird of low, arid terrain (though it now also frequents bare ground in the hills) suggests that like some other Macaronesian birds such as the Canary Chat *Saxicola dacotiae* it may be an early subtropical rather than a more recent glacial relict.

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